

WO 2005/082408

PCT/EP2005/002105

1/29

SEQUENCE LISTING

<110> INSERM

<120> A vaccine composition comprising an immunoadjuvant compound consisting of a Rho GTPase family activator

<130> Q971EP

<160> 9

<170> PatentIn version 3.1

<210> 1

<211> 1014

<212> PRT

<213> Escherichia coli

<400> 1

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Val Ser Asn Phe Pro Ser Pro Glu Arg Val Val Ser Asp Tyr Ile Lys  
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Asn Cys Phe Lys Thr Asp Leu Pro Trp Phe Ser Arg Ile Asp Pro Asp  
35 40 45

Asn Ala Tyr Phe Ile Cys Phe Ser Gln Asn Arg Ser Asn Ser Arg Ser  
50 55 60

Tyr Thr Gly Trp Asp His Leu Gly Lys Tyr Lys Thr Glu Val Leu Thr  
65 70 75 80

Leu Thr Gln Ala Ala Leu Ile Asn Ile Gly Tyr Arg Phe Asp Val Phe  
85 90 95

Asp Asp Ala Asn Ser Ser Thr Gly Ile Tyr Lys Thr Lys Ser Ala Asp  
100 105 110

Val Phe Asn Glu Glu Asn Glu Glu Lys Met Leu Pro Ser Glu Tyr Leu  
115 120 125

His Phe Leu Gln Lys Cys Asp Phe Ala Gly Val Tyr Gly Lys Thr Leu  
130 135 140

Ser Asp Tyr Trp Ser Lys Tyr Tyr Asp Lys Phe Lys Leu Leu Lys  
145 150 155 160

Asn Tyr Tyr Ile Ser Ser Ala Leu Tyr Leu Tyr Lys Asn Gly Glu Leu

CONFIRMATION COPY

	165		170		175										
Asp	Glu	Arg	Glu	Tyr	Asn	Phe	Ser	Met	Asn	Ala	Leu	Asn	Arg	Ser	Asp
	180							185					190		
Asn	Ile	Ser	Leu	Leu	Phe	Phe	Asp	Ile	Tyr	Gly	Tyr	Tyr	Ala	Ser	Asp
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Ile	Phe	Val	Ala	Lys	Asn	Asn	Asp	Lys	Val	Met	Leu	Phe	Ile	Pro	Gly
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Ala	Lys	Lys	Pro	Phe	Leu	Phe	Lys	Lys	Asn	Ile	Ala	Asp	Leu	Arg	Leu
225					230					235					240
Thr	Leu	Lys	Glu	Leu	Ile	Lys	Asp	Ser	Asp	Lys	Gln	Gln	Leu	Leu	Ser
				245					250					255	
Gln	His	Phe	Ser	Leu	Tyr	Ser	Arg	Gln	Asp	Gly	Val	Ser	Tyr	Ala	Gly
			260					265					270		
Val	Asn	Ser	Val	Leu	His	Ala	Ile	Glu	Asn	Asp	Gly	Asn	Phe	Asn	Glu
	275						280					285			
Ser	Tyr	Phe	Leu	Tyr	Ser	Asn	Lys	Thr	Leu	Ser	Asn	Lys	Asp	Val	Phe
	290					295					300				
Asp	Ala	Ile	Ala	Ile	Ser	Val	Lys	Lys	Arg	Ser	Phe	Ser	Asp	Gly	Asp
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Ile	Val	Ile	Lys	Ser	Asn	Ser	Glu	Ala	Gln	Arg	Asp	Tyr	Ala	Leu	Thr
			325						330					335	
Ile	Leu	Gln	Thr	Ile	Leu	Ser	Met	Thr	Pro	Ile	Phe	Asp	Ile	Val	Val
			340					345					350		
Pro	Glu	Val	Ser	Val	Pro	Leu	Gly	Leu	Gly	Ile	Ile	Thr	Ser	Ser	Met
	355						360					365			
Gly	Ile	Ser	Phe	Asp	Gln	Leu	Ile	Asn	Gly	Asp	Thr	Tyr	Glu	Glu	Arg
	370					375				380					
Arg	Ser	Ala	Ile	Pro	Gly	Leu	Ala	Thr	Asn	Ala	Val	Leu	Leu	Gly	Leu
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Ser	Phe	Ala	Ile	Pro	Leu	Leu	Ile	Ser	Lys	Ala	Gly	Ile	Asn	Gln	Glu
				405					410					415	

CONFIRMATION COPY

Val Leu Ser Ser Val Ile Asn Asn Glu Gly Arg Thr Leu Asn Glu Thr  
420 425 430

Asn Ile Asp Ile Phe Leu Lys Glu Tyr Gly Ile Ala Glu Asp Ser Ile  
435 440 445

Ser Ser Thr Asn Leu Leu Asp Val Lys Leu Lys Ser Ser Gly Gln His  
450 455 460

Val Asn Ile Val Lys Leu Ser Asp Glu Asp Asn Gln Ile Val Ala Val  
465 470 475 480

Lys Gly Ser Ser Leu Ser Gly Ile Tyr Tyr Glu Val Asp Ile Glu Thr  
485 490 495

Gly Tyr Glu Ile Leu Ser Arg Arg Ile Tyr Arg Thr Glu Tyr Asn Asn  
500 505 510

Glu Ile Leu Trp Thr Arg Gly Gly Gly Leu Lys Gly Gly Gln Pro Phe  
515 520 525

Asp Phe Glu Ser Leu Asn Ile Pro Val Phe Phe Lys Asp Glu Pro Tyr  
530 535 540

Ser Ala Val Thr Gly Ser Pro Leu Ser Phe Ile Asn Asp Asp Ser Ser  
545 550 555 560

Leu Leu Tyr Pro Asp Thr Asn Pro Lys Leu Pro Gln Pro Thr Ser Glu  
565 570 575

Met Asp Ile Val Asn Tyr Val Lys Gly Ser Gly Ser Phe Gly Asp Arg  
580 585 590

Phe Val Thr Leu Met Arg Gly Ala Thr Glu Glu Glu Ala Trp Asn Ile  
595 600 605

Ala Ser Tyr His Thr Ala Gly Gly Ser Thr Glu Glu Leu His Glu Ile  
610 615 620

Leu Leu Gly Gln Gly Pro Gln Ser Ser Leu Gly Phe Thr Glu Tyr Thr  
625 630 635 640

Ser Asn Val Asn Ser Ala Asp Ala Ala Ser Arg Arg His Phe Leu Val  
645 650 655

Val Ile Lys Val His Val Lys Tyr Ile Thr Asn Asn Asn Val Ser Tyr  
 660 665 670

Val Asn His Trp Ala Ile Pro Asp Glu Ala Pro Val Glu Val Leu Ala  
 675 680 685

Val Val Asp Arg Arg Phe Asn Phe Pro Glu Pro Ser Thr Pro Pro Asp  
 690 695 700

Ile Ser Thr Ile Arg Lys Leu Leu Ser Leu Arg Tyr Phe Lys Glu Ser  
 705 710 715 720

Ile Glu Ser Thr Ser Lys Ser Asn Phe Gln Lys Leu Ser Arg Gly Asn  
 725 730 735

Ile Asp Val Leu Lys Gly Arg Gly Ser Ile Ser Ser Thr Arg Gln Arg  
 740 745 750

Ala Ile Tyr Pro Tyr Phe Glu Ala Ala Asn Ala Asp Glu Gln Gln Pro  
 755 760 765

Leu Phe Phe Tyr Ile Lys Lys Asp Arg Phe Asp Asn His Gly Tyr Asp  
 770 775 780

Gln Tyr Phe Tyr Asp Asn Thr Val Gly Leu Asn Gly Ile Pro Thr Leu  
 785 790 795 800

Asn Thr Tyr Thr Gly Glu Ile Pro Ser Asp Ser Ser Ser Leu Gly Ser  
 805 810 815

Thr Tyr Trp Lys Lys Tyr Asn Leu Thr Asn Glu Thr Ser Ile Ile Arg  
 820 825 830

Val Ser Asn Ser Ala Arg Gly Ala Asn Gly Ile Lys Ile Ala Leu Glu  
 835 840 845

Glu Val Gln Glu Gly Lys Pro Val Ile Ile Thr Ser Gly Asn Leu Ser  
 850 855 860

Gly Cys Thr Thr Ile Val Ala Arg Lys Glu Gly Tyr Ile Tyr Lys Val  
 865 870 875 880

His Thr Gly Thr Thr Lys Ser Leu Ala Gly Phe Thr Ser Thr Thr Gly  
 885 890 895

5/29

Val Lys Lys Ala Val Glu Val Leu Glu Leu Leu Thr Lys Glu Pro Ile  
 900 905 910

Pro Arg Val Glu Gly Ile Met Ser Asn Asp Phe Leu Val Asp Tyr Leu  
 915 920 925

Ser Glu Asn Phe Glu Asp Ser Leu Ile Thr Tyr Ser Ser Ser Glu Lys  
 930 935 940

Lys Pro Asp Ser Gln Ile Thr Ile Ile Arg Asp Asn Val Ser Val Phe  
 945 950 955 960

Pro Tyr Phe Leu Asp Asn Ile Pro Glu His Gly Phe Gly Thr Ser Ala  
 965 970 975

Thr Val Leu Val Arg Val Asp Gly Asn Val Val Val Arg Ser Leu Ser  
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Glu Ser Tyr Ser Leu Asn Ala Asp Ala Ser Glu Ile Ser Val Leu Lys  
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Val Phe Ser Lys Lys Phe  
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<210> 2  
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 <212> PRT  
 <213> Escherichia coli

<400> 2

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Val Ser Asn Phe Pro Ser Pro Glu Arg Val Val Ser Asp Tyr Ile Arg  
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Arg Cys Phe Lys Thr Asp Leu Pro Trp Phe Ser Gln Val Asp Pro Asp  
 35 40 45

Asn Thr Tyr Phe Ile Arg Phe Ser Gln Ser Arg Ser Asn Ser Arg Ser  
 50 55 60

Tyr Thr Gly Trp Asp His Leu Gly Lys Tyr Lys Thr Gly Val Leu Thr  
 65 70 75 80

Leu Thr Gln Ala Ala Leu Ile Asn Ile Gly Tyr His Phe Asp Val Phe  
 85 90 95

CONFIRMATION COPY

Asp Asp Ala Asn Ala Ser Ala Gly Ile Tyr Lys Thr Ser Ser Ala Asp  
 100 105 110

Met Phe Asn Glu Lys Asn Glu Glu Lys Met Leu Pro Ser Glu Tyr Leu  
 115 120 125

Tyr Phe Leu Lys Gly Cys Asp Phe Ser Gly Ile Tyr Gly Arg Phe Leu  
 130 135 140

Ser Asp Tyr Trp Ser Lys Tyr Tyr Asp Lys Phe Lys Leu Leu Leu Lys  
 145 150 155 160

Asn Tyr Tyr Ile Ser Ser Ala Leu Tyr Leu Tyr Lys Asn Gly Glu Ile  
 165 170 175

Asp Glu Tyr Glu Tyr Asn Phe Ser Ile Ser Ala Leu Asn Arg Arg Asp  
 180 185 190

Asn Ile Ser Leu Phe Phe Phe Asp Ile Tyr Gly Tyr Tyr Ser Ser Asp  
 195 200 205

Met Phe Val Ala Lys Asn Asn Glu Arg Val Met Leu Phe Ile Pro Gly  
 210 215 220

Ala Lys Lys Pro Phe Leu Phe Glu Lys Asn Ile Ala Asp Leu Arg Ile  
 225 230 235 240

Ser Leu Lys Asn Leu Ile Lys Glu Asn Asp Asn Lys Gln Leu Leu Ser  
 245 250 255

Gln His Phe Ser Leu Tyr Ser Arg Gln Asp Gly Ile Thr Tyr Ala Gly  
 260 265 270

Val Asn Ser Val Leu Asn Ala Ile Glu Asn Asp Gly Val Phe Asn Glu  
 275 280 285

Ser Tyr Phe Leu Tyr Ser Asn Lys Arg Ile Asn Asn Lys Asp Val Phe  
 290 295 300

Asp Ala Val Ala Phe Ser Val Lys Lys Arg Ser Phe Ser Asp Gly Asp  
 305 310 315 320

Ile Val Ile Lys Ser Asn Ser Glu Ala Gln Arg Asp Tyr Ala Leu Thr  
 325 330 335

Ile Leu Gln Thr Ile Leu Ser Met Thr Pro Ile Phe Asp Val Ala Ile  
 340 345 350  
 Pro Glu Val Ser Val Thr Leu Gly Leu Gly Ile Ile Ala Ser Ser Met  
 355 360 365  
 Gly Ile Ser Phe Asp Gln Leu Ile Asn Gly Asp Thr Tyr Glu Glu Arg  
 370 375 380  
 Arg Ser Ala Ile Pro Gly Leu Ala Thr Asn Ala Ala Leu Leu Gly Leu  
 385 390 395 400  
 Ser Phe Ala Ile Pro Phe Leu Ile Ser Lys Ala Gly Thr Asn Gln Lys  
 405 410 415  
 Ile Leu Ser Arg Tyr Thr Lys His Glu Ile Arg Thr Leu Asn Glu Thr  
 420 425 430  
 Asn Ile Asp Met Phe Leu Glu Glu Tyr Gly Ile Asn Lys Asn Ser Ile  
 435 440 445  
 Ser Glu Thr Lys Val Leu Glu Val Glu Leu Lys Gly Ser Gly Gln His  
 450 455 460  
 Val Asn Ile Val Lys Leu Ser Asp Glu Asp Asn Lys Ile Val Ala Val  
 465 470 475 480  
 Lys Gly Asn Ser Leu Ser Gly Ile Tyr Tyr Glu Val Asp Ile Glu Thr  
 485 490 495  
 Gly Tyr Glu Ile Ser Ser Arg Arg Ile Tyr Arg Thr Glu Tyr Asn Asp  
 500 505 510  
 Lys Ile Phe Trp Thr Arg Gly Gly Gly Leu Lys Gly Gly Gln Ser Phe  
 515 520 525  
 Asp Phe Glu Ser Leu Lys Leu Pro Ile Phe Phe Lys Asp Glu Pro Tyr  
 530 535 540  
 Ser Ala Val Pro Gly Ser Ser Leu Ser Phe Ile Asn Asp Asp Ser Ser  
 545 550 555 560  
 Leu Leu Tyr Pro Asn Ser Thr Pro Lys Leu Pro Gln Pro Thr Pro Glu  
 565 570 575

Met Glu Ile Val Asn Tyr Val Lys Arg Ala Gly Asn Phe Gly Glu Arg  
580 585 590

Leu Val Thr Leu Met Arg Gly Thr Thr Glu Glu Glu Ala Trp Asn Ile  
595 600 605

Ala Arg Tyr His Thr Ala Gly Gly Ser Thr Glu Glu Leu His Glu Ile  
610 615 620

Leu Leu Gly Gln Gly Pro Gln Ser Ser Leu Gly Phe Thr Glu Tyr Thr  
625 630 635 640

Ser Asn Ile Asn Ser Ala Asp Ala Ala Ser Arg Arg His Phe Leu Val  
645 650 655

Val Ile Lys Val Gln Val Lys Tyr Ile Asn Asn Asn Asn Val Ser His  
660 665 670

Val Asn His Trp Ala Ile Pro Asp Glu Ala Pro Val Glu Val Leu Ala  
675 680 685

Val Val Asp Arg Arg Phe Asn Phe Pro Glu Pro Ser Thr Pro Pro Asn  
690 695 700

Ile Ser Ile Ile His Lys Leu Leu Ser Leu Arg Tyr Phe Lys Glu Asn  
705 710 715 720

Ile Glu Ser Thr Ser Arg Leu Asn Leu Gln Lys Leu Asn Arg Gly Asn  
725 730 735

Ile Asp Ile Phe Lys Gly Arg Gly Ser Ile Ser Ser Thr Arg Gln Arg  
740 745 750

Ala Ile Tyr Pro Tyr Phe Glu Ser Ala Asn Ala Asp Glu Gln Gln Pro  
755 760 765

Val Phe Phe Tyr Ile Lys Lys Asn Arg Phe Asp Asp Phe Gly Tyr Asp  
770 775 780

Gln Tyr Phe Tyr Asn Ser Thr Val Gly Leu Asn Gly Ile Pro Thr Leu  
785 790 795 800

Asn Thr Tyr Thr Gly Glu Ile Leu Ser Asp Ala Ser Ser Leu Gly Ser  
805 810 815

Thr Tyr Trp Lys Lys Tyr Asn Leu Thr Asn Glu Thr Ser Ile Ile Arg



9/29

820                      825                      830  
 Val Ser Asn Ser Ala Arg Gly Ala Asn Gly Ile Lys Ile Ala Leu Glu  
       835                      840                      845  
 Glu Val Gln Glu Gly Lys Pro Val Ile Ile Thr Ser Gly Asn Leu Ser  
       850                      855                      860  
 Gly Cys Thr Thr Ile Val Ala Arg Lys Gly Gly Tyr Leu Tyr Lys Val  
       865                      870                      875                      880  
 His Thr Gly Thr Thr Ile Pro Leu Ala Gly Phe Thr Ser Thr Thr Gly  
                               885                      890                      895  
 Val Lys Lys Ala Val Glu Val Phe Glu Leu Leu Thr Asn Asn Pro Met  
                               900                      905                      910  
 Pro Arg Val Glu Gly Val Met Asn Asn Asp Phe Leu Val Asn Tyr Leu  
                               915                      920                      925  
 Ala Glu Ser Phe Asp Glu Ser Leu Ile Thr Tyr Ser Ser Ser Glu Gln  
                               930                      935                      940  
 Lys Ile Gly Ser Lys Ile Thr Ile Ser Arg Asp Asn Val Ser Thr Phe  
       945                      950                      955                      960  
 Pro Tyr Phe Leu Asp Asn Ile Pro Glu Lys Gly Phe Gly Thr Ser Val  
                               965                      970                      975  
 Thr Ile Leu Val Arg Val Asp Gly Asn Val Ile Val Lys Ser Leu Ser  
                               980                      985                      990  
 Glu Ser Tyr Ser Leu Asn Val Glu Asn Ser Asn Ile Ser Val Leu His  
                               995                      1000                      1005  
 Val Phe Ser Lys Asp Phe  
       1010  
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 <211> 1014  
 <212> PRT  
 <213> Yersinia pseudotuberculosis  
 <400> 3  
 Met Lys Asn Gln Trp Gln His Gln Tyr Phe Leu Ser Tyr Ser Glu Leu  
       1                      5                      10                      15

CONFIRMATION COPY

10/29

Val Ala Asn Phe Pro Ser Pro Glu Lys Val Val Ser Asp Tyr Ile Lys  
                   20                  25                  30

His Lys Phe Ser Thr Thr Leu Pro Trp Phe Gly Trp Ala Asp Pro Asp  
           35                  40                  45

Asn Leu Tyr Phe Ile Arg Phe Thr Gln Ser Arg Ser Asn Asn Lys Ser  
       50                  55                  60

Tyr Thr Gly Trp Asp His Leu Gly Lys Tyr Ala Ile Glu Thr Leu Thr  
   65                  70                  75                  80

Leu Thr Gln Ala Ala Ile Val Asn Ile Gly Ser Arg Phe Asp Ile Phe  
                   85                  90                  95

Asp Glu Ala Asn Ser Thr Ala Gly Ile Tyr Lys Thr Asn Asn Ala Asp  
                  100                 105                 110

Ser Phe Asp Glu Thr Asn Glu Ala Lys Met Leu Pro Ser Glu Tyr Leu  
          115                 120                 125

Tyr Phe Leu Arg Asp Cys Asp Phe Ser Asn Leu Tyr Asn Lys Ala Leu  
      130                 135                 140

Ser Asp Tyr Trp Ala Glu Asn Tyr Glu Lys Phe Ser Thr Leu Leu Gln  
   145                 150                 155                 160

Asn Tyr Tyr Ile Ser Ser Ala Tyr Tyr Leu Tyr Lys Asp Ser Ala Ile  
          165                 170                 175

Ser Lys Asp Glu Tyr Glu Phe Ser Ile Asp Ala Ile Phe Asn Lys Lys  
          180                 185                 190

Ser Lys Ile Leu Arg Tyr Tyr Phe Asp Val Tyr Gly Tyr Tyr Ser Ser  
          195                 200                 205

Asp Met Phe Val Ala Met Asn Asp Asn Lys Thr Met Leu Phe Ile Pro  
      210                 215                 220

Gly Ala Thr Asn Pro Phe Ile Phe Ala Asp Asn Ile Thr Asp Leu Arg  
   225                 230                 235                 240

Asp Lys Ile Lys Ala Leu Ile Ser Asp Lys Asn Thr Arg Glu Leu Phe  
          245                 250                 255

CONFIRMATION COPY

11/29

Ser Lys His Phe Ser Leu Tyr Asp Arg Gln Asp Gly Asn Thr Tyr Leu  
260 265 270

Gly Val Asn Ser Met Leu Glu Gln Ile Val Ser Gly Val Val Asp Thr  
275 280 285

Asn Tyr Ile Met Tyr Ser Asn Lys Asn Ile Arg Glu Arg Asn Val Phe  
290 295 300

Gly Ser Met Ala Phe Ser Thr Arg Glu Arg Ser Phe Asn Asp Gly Asp  
305 310 315 320

Val Ile Ile Lys Ser Asn Ala Glu Val Gln Arg Asp Tyr Ala Leu Asn  
325 330 335

Val Leu Gln Thr Ile Leu Ser Leu Ser Pro Ile Phe Asp Ile Val Leu  
340 345 350

Pro Glu Val Ser Ile Pro Ile Ser Leu Gly Ile Thr Ala Ser Ser Val  
355 360 365

Gly Ile Ser Phe Asp Glu Leu Ile Asn Gly Asp Thr Tyr Glu Glu Arg  
370 375 380

Arg Ser Ala Ile Pro Gly Leu Ala Thr Asn Thr Val Leu Leu Gly Ile  
385 390 395 400

Ser Phe Ala Ile Pro Phe Leu Ile Ser Lys Ala Glu Glu Asn Lys Leu  
405 410 415

Ile Ile Asn Asn Leu Val Gly Ser Asp Glu Asn Ile Leu Asn Lys Asn  
420 425 430

Asn Leu Gly Asp Phe Leu Glu Lys Tyr Asn Ile Ser Glu Ser Asp Ile  
435 440 445

Pro Glu Asn Gly Ser Leu Val Ile Asn Leu Lys Asn Thr Asn Val Pro  
450 455 460

Val Arg Leu Val Lys Leu Asn Asp Glu Glu Gly Glu Ile Val Ala Ile  
465 470 475 480

Lys Gly Ser Thr Leu Ser Gly Ile Tyr Tyr Glu Val Asp Thr Glu Thr  
485 490 495

Gly Tyr Glu Ile Leu Ser Arg Arg Val Phe Arg Thr Glu Tyr Asn Glu

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12/29

500	505	510
Lys Ile Tyr Trp Thr Arg Gly Gly Gly Leu Lys Gly Gly Gln Pro Phe 515 520 525		
Asn Phe Glu Gly Leu Asp Ile Pro Val Tyr Phe Ile Asp Lys Pro Tyr 530 535 540		
Ser Glu Leu Ala Ser Ser Val Glu Leu Ser Phe Val Asn Asp Asp Ser 545 550 555 560		
Pro Leu Leu Phe Pro Glu Met Asp Ser Arg Leu Pro Lys Pro Thr Pro 565 570 575		
Glu Leu Asp Ile Lys Tyr Tyr Ser Ser Asn Leu Ser Ser Phe Lys Glu 580 585 590		
Asp Thr Val Ile Leu Met Arg Gly Thr Thr Glu Glu Glu Ala Trp Asn 595 600 605		
Ile Ala Asn Tyr Lys Thr Ala Gly Gly Ser Asn Lys Asp Leu Glu Glu 610 615 620		
Asn Phe Ile Glu Ala Gly Pro Gln Phe Asn Leu Ser Phe Ser Glu Tyr 625 630 635 640		
Thr Ser Ser Ile Asn Ser Ala Asp Thr Ala Ser Arg Lys His Phe Leu 645 650 655		
Val Ile Ile Lys Val Gln Val Lys Tyr Ile Ser Asn Asp Asn Val Leu 660 665 670		
Tyr Ala Asn His Trp Ala Ile Pro Asp Glu Ala Pro Val Glu Val Leu 675 680 685		
Ala Val Val Asp Arg Arg Phe Ile Phe Pro Glu Pro Pro Val Lys Pro 690 695 700		
Lys Leu Ser Phe Ile Gln Lys Ile Ala Asn Arg Phe Leu Thr Glu Asn 705 710 715 720		
Val Ala Glu Ile Ser Ser Ile Asn Phe Arg Arg Leu Asn Ser Gly Asn 725 730 735		
Ile Asn Val Leu Lys Gly Arg Gly Val Phe Ser Ser Arg Arg Leu Arg 740 745 750		

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Glu Ile Tyr Leu Arg Phe Asp Ala Ala Asn Ala Asp Glu Leu Arg Pro  
 755 760 765

Gly Asp Val Tyr Val Lys Lys Thr Lys Phe Asp Ser Met Gly Tyr Asp  
 770 775 780

Ser His Phe Tyr Asn Glu Gly Ile Gly Ile Asn Gly Ala Pro Thr Leu  
 785 790 795 800

Asn Thr Tyr Thr Gly Glu Tyr Val Ala Asp Ser Ser Ser Gln Gly Ala  
 805 810 815

Thr Tyr Trp Leu Lys Tyr Asn Leu Thr Asn Glu Thr Ser Ile Ile Lys  
 820 825 830

Val Ser Asn Ser Ala Arg Gly Ala Asn Gly Ile Lys Ile Ala Leu Glu  
 835 840 845

Glu Ile Glu Glu Asn Lys Pro Val Val Ile Thr Ser Gly Thr Leu Thr  
 850 855 860

Gly Cys Thr Val Val Phe Ala Arg Lys Gly Glu Tyr Phe Tyr Ala Val  
 865 870 875 880

His Thr Gly Asn Ser Glu Ser Leu Ile Gly Phe Thr Ser Thr Ser Gly  
 885 890 895

Val Ala Lys Ala Ile Glu Val Leu Ser Ser Leu Ser Glu Leu Glu Val  
 900 905 910

Pro Ala Leu Pro Asp Val Ile Asn Asn Asn Thr Leu Val Glu Tyr Leu  
 915 920 925

Ser Asp Asn Phe Asp Ser Ala Leu Ile Ser Tyr Ser Ser Ser Ser Leu  
 930 935 940

Lys Pro Asn Ser Met Ile Asn Ile Ser Arg Glu Asn Val Ser Thr Phe  
 945 950 955 960

Ser Tyr Tyr Thr Asp Asp Ile Gln Leu Pro Ser Phe Gly Thr Ser Val  
 965 970 975

Thr Ile Leu Val Arg Thr Asn Asp Asn Thr Val Val Arg Ser Leu Ser  
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Glu Ser Tyr Thr Met Asn Ser Asn Ser Ser Lys Met Val Val Phe Asn  
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Val Leu Gln Lys Asp Phe  
 1010

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 <212> PRT  
 <213> Bordetella pertussis

<400> 4

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Lys Ala Glu Phe Ala Leu Phe Ser Glu Ala Pro Asn Gly Asp Glu Pro  
 35 40 45

Ile Gly Gln Asp Ala Arg Thr Trp Phe Tyr Phe Pro Lys Tyr Arg Pro  
 50 55 60

Val Ala Val Ser Asn Leu Lys Lys Met Gln Val Ala Ile Arg Ala Arg  
 65 70 75 80

Leu Glu Pro Glu Ser Leu Ile Leu Gln Trp Leu Ile Ala Leu Asp Val  
 85 90 95

Tyr Leu Gly Val Leu Ile Ala Ala Leu Ser Arg Thr Val Ile Ser Asp  
 100 105 110

Leu Val Phe Glu Tyr Val Lys Ala Arg Tyr Glu Ile Tyr Tyr Leu Leu  
 115 120 125

Asn Arg Val Pro His Pro Leu Ala Thr Ala Tyr Leu Lys Arg Arg Arg  
 130 135 140

Gln Arg Pro Val Asp Arg Ser Gly Arg Leu Gly Ser Val Phe Glu His  
 145 150 155 160

Pro Leu Trp Phe Ala Tyr Asp Glu Leu Ala Gly Thr Val Asp Leu Asp  
 165 170 175

Ala Asp Ile Tyr Glu Gln Ala Leu Ala Glu Ser Ile Glu Arg Arg Met

180	185	190
Asp Gly Glu Pro Asp Asp Gly Ser Leu Asp Thr Ala Glu His Asp Val		
195	200	205
Trp Arg Leu Cys Arg Asp Gly Ile Asn Arg Gly Glu Gln Ala Ile Phe		
210	215	220
Gln Ala Ser Gly Pro Tyr Gly Val Val Ala Asp Ala Gly Tyr Met Arg		
225	230	235
Thr Val Ala Asp Leu Ala Tyr Ala Asp Ala Leu Ala Asp Cys Leu His		
245	250	255
Ala Gln Leu Arg Ile Arg Ala Gln Gly Ser Val Asp Ser Pro Gly Asp		
260	265	270
Glu Met Pro Arg Lys Leu Asp Ala Trp Glu Ile Ala Lys Phe His Leu		
275	280	285
Ala Ala Thr Gln Gln Ala Arg Val Asp Leu Leu Glu Ala Ala Phe Ala		
290	295	300
Leu Asp Tyr Ala Ala Leu Arg Asp Val Arg Val Tyr Gly Asp Tyr Arg		
305	310	315
Asn Ala Leu Ala Leu Arg Phe Ile Lys Arg Glu Ala Leu Arg Leu Leu		
325	330	335
Gly Ala Arg Arg Gly Asn Ala Ser Thr Met Pro Ala Val Ala Ala Gly		
340	345	350
Glu Tyr Asp Glu Ile Val Ala Ser Gly Ala Ala Asn Asp Ala Ala Tyr		
355	360	365
Val Ser Met Ala Ala Ala Leu Ile Ala Gly Val Leu Cys Asp Leu Glu		
370	375	380
Ser Ala Gln Arg Thr Leu Pro Val Val Leu Ala Arg Phe Arg Pro Leu		
385	390	395
Gly Val Leu Ala Arg Phe Arg Arg Leu Glu Gln Glu Thr Ala Gly Met		
405	410	415
Leu Leu Gly Asp Gln Glu Pro Glu Pro Arg Gly Phe Ile Ser Phe Thr		
420	425	430

CONFIRMATION COPY

Asp Phe Arg Asp Ser Asp Ala Phe Ala Ser Tyr Ala Glu Tyr Ala Ala  
 435 440 445

Gln Phe Asn Asp Tyr Ile Asp Gln Tyr Ser Ile Leu Glu Ala Gln Arg  
 450 455 460

Leu Ala Arg Ile Leu Ala Leu Gly Ser Arg Met Thr Val Asp Gln Trp  
 465 470 475 480

Cys Leu Pro Leu Gln Lys Val Arg His Tyr Lys Val Leu Thr Ser Gln  
 485 490 495

Pro Gly Leu Ile Ala Arg Gly Ile Glu Asn His Asn Arg Gly Ile Glu  
 500 505 510

Tyr Cys Leu Gly Arg Pro Pro Leu Thr Asp Leu Pro Gly Leu Phe Thr  
 515 520 525

Met Phe Gln Leu His Asp Ser Ser Trp Leu Leu Val Ser Asn Ile Asn  
 530 535 540

Gly Glu Leu Trp Ser Asp Val Leu Ala Asn Ala Glu Val Met Gln Asn  
 545 550 555 560

Pro Thr Leu Ala Ala Leu Ala Glu Pro Gln Gly Arg Phe Arg Thr Gly  
 565 570 575

Arg Arg Thr Gly Gly Trp Phe Leu Gly Gly Pro Ala Thr Glu Gly Pro  
 580 585 590

Ser Leu Arg Asp Asn Tyr Leu Leu Lys Leu Arg Gln Ser Asn Pro Gly  
 595 600 605

Leu Asp Val Lys Lys Cys Trp Tyr Phe Gly Tyr Arg Gln Glu Tyr Arg  
 610 615 620

Leu Pro Ala Gly Ala Leu Gly Val Pro Leu Phe Ala Val Ser Val Ala  
 625 630 635 640

Leu Arg His Ser Leu Asp Asp Leu Ala Ala His Ala Lys Ser Ala Leu  
 645 650 655

Tyr Lys Pro Ser Glu Trp Gln Lys Phe Ala Phe Trp Ile Val Pro Phe  
 660 665 670

CONFIRMATION COPY



Tyr Arg Glu Ile Phe Phe Ser Thr Gln Asp Arg Ser Tyr Arg Val Asp  
 675 680 685  
 Val Gly Ser Ile Val Phe Asp Ser Ile Ser Leu Leu Ala Ser Val Phe  
 690 695 700  
 Ser Ile Gly Gly Lys Leu Gly Ser Phe Thr Arg Thr Gln Tyr Gly Asn  
 705 710 715 720  
 Leu Arg Asn Phe Val Val Arg Gln Arg Ile Ala Gly Leu Ser Gly Gln  
 725 730 735  
 Arg Leu Trp Arg Ser Val Leu Lys Glu Leu Pro Ala Leu Ile Gly Ala  
 740 745 750  
 Ser Gly Leu Arg Leu Ser Arg Ser Leu Leu Val Asp Leu Tyr Glu Ile  
 755 760 765  
 Phe Glu Pro Val Pro Ile Arg Arg Leu Val Ala Gly Phe Val Ser Ala  
 770 775 780  
 Thr Thr Val Gly Gly Arg Asn Gln Ala Phe Leu Arg Gln Ala Phe Ser  
 785 790 795 800  
 Ala Ala Ser Ser Ser Ala Gly Arg Thr Gly Gly Gln Leu Ala Ser Glu  
 805 810 815  
 Trp Arg Met Ala Gly Val Asp Ala Thr Gly Leu Val Glu Ser Thr Ser  
 820 825 830  
 Gly Gly Arg Phe Glu Gly Ile Tyr Thr Arg Gly Leu Gly Pro Leu Ser  
 835 840 845  
 Glu Cys Thr Glu His Phe Ile Val Glu Ser Gly Asn Ala Tyr Arg Val  
 850 855 860  
 Ile Trp Asp Ala Tyr Thr His Gly Trp Arg Val Val Asn Gly Arg Leu  
 865 870 875 880  
 Pro Pro Arg Leu Thr Tyr Thr Val Pro Val Arg Leu Asn Gly Gln Gly  
 885 890 895  
 His Trp Glu Thr His Leu Asp Val Pro Gly Arg Gly Gly Ala Pro Glu  
 900 905 910

Ile Phe Gly Arg Ile Arg Thr Arg Asn Leu Val Ala Leu Ala Ala Glu  
 915 920 925

Gln Ala Ala Pro Met Arg Arg Leu Leu Asn Gln Ala Arg Arg Val Ala  
 930 935 940

Leu Arg His Ile Asp Thr Cys Arg Ser Arg Leu Ala Leu Pro Arg Ala  
 945 950 955 960

Glu Ser Asp Met Asp Ala Ala Ile Arg Ile Phe Phe Gly Glu Pro Asp  
 965 970 975

Ala Gly Leu Arg Gln Arg Ile Gly Arg Arg Leu Gln Glu Val Arg Ala  
 980 985 990

Tyr Ile Gly Asp Leu Ser Pro Val Asn Asp Val Leu Tyr Arg Ala Gly  
 995 1000 1005

Tyr Asp Leu Asp Asp Val Ala Thr Leu Phe Asn Ala Val Asp Arg  
 1010 1015 1020

Asn Thr Ser Leu Gly Arg Gln Ala Arg Met Glu Leu Tyr Leu Asp  
 1025 1030 1035

Ala Ile Val Asp Leu His Ala Arg Leu Gly Tyr Glu Asn Ala Arg  
 1040 1045 1050

Phe Val Asp Leu Met Ala Phe His Leu Leu Ser Leu Gly His Ala  
 1055 1060 1065

Ala Thr Ala Ser Glu Val Val Glu Ala Val Ser Pro Arg Leu Leu  
 1070 1075 1080

Gly Asn Val Phe Asp Ile Ser Asn Val Ala Gln Leu Glu Arg Gly  
 1085 1090 1095

Ile Gly Asn Pro Ala Ser Thr Gly Leu Phe Val Met Leu Gly Ala  
 1100 1105 1110

Tyr Ser Glu Ser Ser Pro Ala Ile Phe Gln Ser Phe Val Asn Asp  
 1115 1120 1125

Ile Phe Pro Ala Trp Arg Gln Ala Ser Gly Gly Gly Pro Leu Val  
 1130 1135 1140

Trp Asn Phe Gly Pro Ala Ala Ile Ser Pro Thr Arg Leu Asp Tyr

1145	1150	1155
Ala Asn Thr Asp Ile Gly Leu 1160	Leu Asn His Gly Asp 1165	Ile Ser Pro 1170
Leu Arg Ala Arg Pro Pro 1175	Leu Gly Gly Arg Arg Asp 1180	Ile Asp Leu 1185
Pro Pro Gly Leu Asp Ile 1190	Ser Phe Val Arg Tyr Asp 1195	Arg Pro Val 1200
Arg Met Ser Ala Pro Arg 1205	Ala Leu Asp Ala Ser Val 1210	Phe Arg Pro 1215
Val Asp Gly Pro Val His 1220	Gly Tyr Ile Gln Ser Trp 1225	Thr Gly Ala 1230
Glu Ile Glu Tyr Ala Tyr 1235	Gly Ala Pro Ala Ala Ala 1240	Arg Glu Val 1245
Met Leu Thr Asp Asn Val 1250	Arg Ile Ile Ser Ile Glu 1255	Asn Gly Asp 1260
Glu Gly Ala Ile Gly Val 1265	Arg Val Arg Leu Asp Thr 1270	Val Pro Val 1275
Ala Thr Pro Leu Ile Leu 1280	Thr Gly Gly Ser Leu Ser 1285	Gly Cys Thr 1290
Thr Met Val Gly Val Lys 1295	Glu Gly Tyr Leu Ala Phe 1300	Tyr His Thr 1305
Gly Lys Ser Thr Glu Leu 1310	Gly Asp Trp Ala Thr Ala 1315	Arg Glu Gly 1320
Val Gln Ala Leu Tyr Gln 1325	Ala His Leu Ala Met Gly 1330	Tyr Ala Pro 1335
Ile Ser Ile Pro Ala Pro 1340	Met Arg Asn Asp Asp Leu 1345	Val Ser Ile 1350
Ala Ala Thr Tyr Asp Arg 1355	Ala Val Ile Ala Tyr Leu 1360	Gly Lys Asp 1365
Val Pro Gly Gly Gly Ser 1370	Thr Arg Ile Thr Arg His 1375	Asp Glu Gly 1380

Ala Gly Ser Val Val Ser Phe Asp Tyr Asn Ala Ala Val Gln Ala  
1385 1390 1395

Ser Ala Val Pro Arg Leu Gly Gln Val Tyr Val Leu Ile Ser Asn  
1400 1405 1410

Asp Gly Gln Gly Ala Arg Ala Val Leu Leu Ala Glu Asp Leu Ala  
1415 1420 1425

Trp Ala Gly Ser Gly Ser Ala Leu Asp Val Leu Asn Glu Arg Leu  
1430 1435 1440

Val Thr Leu Phe Pro Ala Pro Val  
1445 1450

<210> 5  
<211> 240  
<212> PRT  
<213> Salmonella typhimurium

<400> 5

Met Thr Lys Ile Thr Leu Ser Pro Gln Asn Phe Arg Ile Gln Lys Gln  
1 5 10 15

Glu Thr Thr Leu Leu Lys Glu Lys Ser Thr Glu Lys Asn Ser Leu Ala  
20 25 30

Lys Ser Ile Leu Ala Val Lys Asn His Phe Ile Glu Leu Arg Ser Lys  
35 40 45

Leu Ser Glu Arg Phe Ile Ser His Lys Asn Thr Glu Ser Ser Ala Thr  
50 55 60

His Phe His Arg Gly Ser Ala Ser Glu Gly Arg Ala Val Leu Thr Asn  
65 70 75 80

Lys Val Val Lys Asp Phe Met Leu Gln Thr Leu Asn Asp Ile Asp Ile  
85 90 95

Arg Gly Ser Ala Ser Lys Asp Pro Ala Tyr Ala Ser Gln Thr Arg Glu  
100 105 110

Ala Ile Leu Ser Ala Val Tyr Ser Lys Asn Lys Asp Gln Cys Cys Asn  
115 120 125

Leu Leu Ile Ser Lys Gly Ile Asn Ile Ala Pro Phe Leu Gln Glu Ile  
130 135 140

Gly Glu Ala Ala Lys Asn Ala Gly Leu Pro Gly Thr Thr Lys Asn Asp  
145 150 155 160

Val Phe Thr Pro Ser Gly Ala Gly Ala Asn Pro Phe Ile Thr Pro Leu  
165 170 175

Ile Ser Ser Ala Asn Ser Lys Tyr Pro Arg Met Phe Ile Asn Gln His  
180 185 190

Gln Gln Ala Ser Phe Lys Ile Tyr Ala Glu Lys Ile Ile Met Thr Glu  
195 200 205

Val Ala Pro Leu Phe Asn Glu Cys Ala Met Pro Thr Pro Gln Gln Phe  
210 215 220

Gln Leu Ile Leu Glu Asn Ile Ala Asn Lys Tyr Ile Gln Tyr Thr Pro  
225 230 235 240

<210> 6  
<211> 240  
<212> PRT  
<213> Salmonella typhimurium

<400> 6

Met Thr Asn Ile Thr Leu Ser Thr Gln His Tyr Arg Ile His Arg Ser  
1 5 10 15

Asp Val Glu Pro Val Lys Glu Lys Thr Thr Glu Lys Asp Ile Phe Ala  
20 25 30

Lys Ser Ile Thr Ala Val Arg Asn Ser Phe Ile Ser Leu Ser Thr Ser  
35 40 45

Leu Ser Asp Arg Phe Ser Leu His Gln Gln Thr Asp Ile Pro Thr Thr  
50 55 60

His Phe His Arg Gly Asn Ala Ser Glu Gly Arg Ala Val Leu Thr Ser  
65 70 75 80

Lys Thr Val Lys Asp Phe Met Leu Gln Lys Leu Asn Ser Leu Asp Ile  
85 90 95

Lys Gly Asn Ala Ser Lys Asp Pro Ala Tyr Ala Arg Gln Thr Cys Glu  
100 105 110

Ala Ile Leu Ser Ala Val Tyr Ser Asn Asn Lys Asp Gln Cys Cys Lys  
115 120 125

Leu Leu Ile Ser Lys Gly Val Ser Ile Thr Pro Phe Leu Lys Glu Ile  
130 135 140

Gly Glu Ala Ala Gln Asn Ala Gly Leu Pro Gly Glu Ile Lys Asn Gly  
145 150 155 160

Val Phe Thr Pro Gly Gly Ala Gly Ala Asn Pro Phe Val Val Pro Leu  
165 170 175

Ile Ala Ser Ala Ser Ile Lys Tyr Pro His Met Phe Ile Asn His Asn  
180 185 190

Gln Gln Val Ser Phe Lys Ala Tyr Ala Glu Lys Ile Val Met Lys Glu  
195 200 205

Val Thr Pro Leu Phe Asn Lys Gly Thr Met Pro Thr Pro Gln Gln Phe  
210 215 220

Gln Leu Thr Ile Glu Asn Ile Ala Asn Lys Tyr Leu Gln Asn Ala Ser  
225 230 235 240

<210> 7  
<211> 166  
<212> PRT  
<213> Shigella flexneri

<400> 7

Met Glu Ile Gln Asn Thr Lys Ser Ala Pro Ile Leu Tyr Thr Asp Ile  
1 5 10 15

Ser Thr Lys Gln Thr Gln Ser Ser Ser Glu Thr Gln Lys Ser Gln Asn  
20 25 30

Tyr Gln Gln Leu Ala Ala His Ile Pro Leu Asn Val Gly Lys Asn Pro  
35 40 45

Val Leu Thr Thr Thr Leu Asn Asp Asp Gln Leu Leu Lys Leu Ser Glu  
50 55 60

Gln Val Gln His Asp Ser Glu Ile Ile Ala Arg Leu Thr Asp Lys Lys  
65 70 75 80

Met Lys Asp Leu Ser Glu Met Ser His Thr Ile Thr Pro Glu Asn Thr  
85 90 95

Leu Asp Ile Ser Ser Leu Ser Ser Asn Ala Val Ser Leu Ile Ile Ser  
100 105 110

Val Ala Val Leu Leu Ser Ala Leu Arg Thr Ala Glu Thr Arg Leu Gly  
115 120 125

Ser Gln Leu Ser Leu Ile Ala Phe Asp Ala Thr Lys Ser Ala Ala Glu  
130 135 140

Asn Ile Val Arg Gln Gly Leu Ala Ala Leu Ser Ser Ser Ile Thr Gly  
145 150 155 160

Ala Val Thr Gln Val Gly  
165

<210> 8  
<211> 1186  
<212> PRT  
<213> Helicobacter pylori

<400> 8

Met Thr Asn Glu Thr Ile Asp Gln Thr Arg Thr Pro Asp Gln Thr Gln  
1 5 10 15

Ser Gln Thr Ala Phe Asp Pro Gln Gln Phe Ile Asn Asn Leu Gln Val  
20 25 30

Ala Phe Ile Lys Val Asp Asn Val Val Ala Ser Phe Asp Pro Asp Gln  
35 40 45

Lys Pro Ile Val Asp Lys Asn Asp Arg Asp Asn Arg Gln Ala Phe Asp  
50 55 60

Gly Ile Ser Gln Leu Arg Glu Glu Tyr Ser Asn Lys Ala Ile Lys Asn  
65 70 75 80

Pro Thr Lys Lys Asn Gln Tyr Phe Ser Asp Phe Ile Asp Lys Ser Asn  
85 90 95

Asp Leu Ile Asn Lys Asp Asn Leu Ile Asp Val Glu Ser Ser Thr Lys  
100 105 110

Ser Phe Gln Lys Phe Gly Asp Gln Arg Tyr Gln Ile Phe Thr Ser Trp  
115 120 125

Val Ser His Gln Lys Asp Pro Ser Lys Ile Asn Thr Arg Ser Ile Arg  
 130 135 140

Asn Phe Met Glu Asn Ile Ile Gln Pro Pro Ile Pro Asp Asp Lys Glu  
 145 150 155 160

Lys Ala Glu Phe Leu Lys Ser Ala Lys Gln Ser Phe Ala Gly Ile Ile  
 165 170 175

Ile Gly Asn Gln Ile Arg Thr Asp Gln Lys Phe Met Gly Val Phe Asp  
 180 185 190

Glu Ser Leu Lys Glu Arg Gln Glu Ala Glu Lys Asn Gly Gly Pro Thr  
 195 200 205

Gly Gly Asp Trp Leu Asp Ile Phe Leu Ser Phe Ile Phe Asn Lys Lys  
 210 215 220

Gln Ser Ser Asp Val Lys Glu Ala Ile Asn Gln Glu Pro Val Pro His  
 225 230 235 240

Val Gln Pro Asp Ile Ala Thr Thr Thr Thr Asp Ile Gln Gly Leu Pro  
 245 250 255

Pro Glu Ala Arg Asp Leu Leu Asp Glu Arg Gly Asn Phe Ser Lys Phe  
 260 265 270

Thr Leu Gly Asp Met Glu Met Leu Asp Val Glu Gly Val Ala Asp Ile  
 275 280 285

Asp Pro Asn Tyr Lys Phe Asn Gln Leu Leu Ile His Asn Asn Ala Leu  
 290 295 300

Ser Ser Val Leu Met Gly Ser His Asn Gly Ile Glu Pro Glu Lys Val  
 305 310 315 320

Ser Leu Leu Tyr Ala Gly Asn Gly Gly Phe Gly Asp Lys His Asp Trp  
 325 330 335

Asn Ala Thr Val Gly Tyr Lys Asp Gln Gln Gly Asn Asn Val Ala Thr  
 340 345 350

Leu Ile Asn Val His Met Lys Asn Gly Ser Gly Leu Val Ile Ala Gly  
 355 360 365



Gly Glu Lys Gly Ile Asn Asn Pro Ser Phe Tyr Leu Tyr Lys Glu Asp  
 370 375 380  
 Gln Leu Thr Gly Ser Gln Arg Ala Leu Ser Gln Glu Glu Ile Arg Asn  
 385 390 395 400  
 Lys Val Asp Phe Met Glu Phe Leu Ala Gln Asn Asn Thr Lys Leu Asp  
 405 410 415  
 Asn Leu Ser Glu Lys Glu Lys Glu Lys Phe Gln Asn Glu Ile Glu Asp  
 420 425 430  
 Phe Gln Lys Asp Ser Lys Ala Tyr Leu Asp Ala Leu Gly Asn Asp Arg  
 435 440 445  
 Ile Ala Phe Val Ser Lys Lys Asp Thr Lys His Ser Ala Leu Ile Thr  
 450 455 460  
 Glu Phe Asn Asn Gly Asp Leu Ser Tyr Thr Leu Lys Asp Tyr Gly Lys  
 465 470 475 480  
 Lys Ala Asp Lys Ala Leu Asp Arg Glu Lys Asn Val Thr Leu Gln Gly  
 485 490 495  
 Ser Leu Lys His Asp Gly Val Met Phe Val Asp Tyr Ser Asn Phe Lys  
 500 505 510  
 Tyr Thr Asn Ala Ser Lys Asn Pro Asn Lys Gly Val Gly Ala Thr Asn  
 515 520 525  
 Gly Val Ser His Leu Glu Ala Gly Phe Asn Lys Val Ala Val Phe Asn  
 530 535 540  
 Leu Pro Asp Leu Asn Asn Leu Ala Ile Thr Ser Phe Val Arg Arg Asn  
 545 550 555 560  
 Leu Glu Asn Lys Leu Thr Ala Lys Gly Leu Ser Leu Gln Glu Ala Asn  
 565 570 575  
 Lys Leu Ile Lys Asp Phe Leu Ser Ser Asn Lys Glu Leu Ala Gly Lys  
 580 585 590  
 Ala Leu Asn Phe Asn Lys Ala Val Ala Glu Ala Lys Ser Thr Gly Asn  
 595 600 605

Tyr Asp Glu Val Lys Lys Ala Gln Lys Asp Leu Glu Lys Ser Leu Arg  
 610 615 620  
 Lys Arg Glu His Leu Glu Lys Glu Val Glu Lys Lys Leu Glu Ser Lys  
 625 630 635 640  
 Ser Gly Asn Lys Asn Lys Met Glu Ala Lys Ala Gln Ala Asn Ser Gln  
 645 650 655  
 Lys Asp Glu Ile Phe Ala Leu Ile Asn Lys Glu Ala Asn Arg Asp Ala  
 660 665 670  
 Arg Ala Ile Ala Tyr Thr Gln Asn Leu Lys Gly Ile Lys Arg Glu Leu  
 675 680 685  
 Ser Asp Lys Leu Glu Lys Ile Ser Lys Asp Leu Lys Asp Phe Ser Lys  
 690 695 700  
 Ser Phe Asp Glu Phe Lys Asn Gly Lys Asn Lys Asp Phe Ser Lys Ala  
 705 710 715 720  
 Glu Glu Thr Leu Lys Ala Leu Lys Gly Ser Val Lys Asp Leu Gly Ile  
 725 730 735  
 Asn Pro Glu Trp Ile Ser Lys Val Glu Asn Leu Asn Ala Ala Leu Asn  
 740 745 750  
 Glu Phe Lys Asn Gly Lys Asn Lys Asp Phe Ser Lys Val Thr Gln Ala  
 755 760 765  
 Lys Ser Asp Leu Glu Asn Ser Val Lys Asp Val Ile Ile Asn Gln Lys  
 770 775 780  
 Val Thr Asp Lys Val Asp Asn Leu Asn Gln Ala Val Ser Val Ala Lys  
 785 790 795 800  
 Ala Met Gly Asp Phe Ser Arg Val Glu Gln Val Leu Ala Asp Leu Lys  
 805 810 815  
 Asn Phe Ser Lys Glu Gln Leu Ala Gln Gln Ala Gln Lys Asn Glu Asp  
 820 825 830  
 Phe Asn Thr Gly Lys Asn Ser Glu Leu Tyr Gln Ser Val Lys Asn Ser  
 835 840 845  
 Val Asn Lys Thr Leu Val Gly Asn Gly Leu Ser Gly Ile Glu Ala Thr

850                      855                      860  
 Ala Leu Ala Lys Asn Phe Ser Asp Ile Lys Lys Glu Leu Asn Glu Lys  
 865                      870                      875                      880  
 Phe Lys Asn Phe Asn Asn Asn Asn Asn Gly Leu Lys Asn Ser Thr Glu  
                     885                      890                      895  
 Pro Ile Tyr Ala Lys Val Asn Lys Lys Lys Thr Gly Gln Val Ala Ser  
                     900                      905                      910  
 Pro Glu Glu Pro Ile Tyr Thr Gln Val Ala Lys Lys Val Asn Ala Lys  
                     915                      920                      925  
 Ile Asp Arg Leu Asn Gln Ile Ala Ser Gly Leu Gly Gly Val Gly Gln  
                     930                      935                      940  
 Ala Ala Gly Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp Leu Ser  
 945                      950                      955                      960  
 Lys Val Gly Leu Ser Ala Ser Pro Glu Pro Ile Tyr Ala Thr Ile Asp  
                     965                      970                      975  
 Asp Leu Gly Gly Pro Phe Pro Leu Lys Arg His Asp Lys Val Asp Asp  
                     980                      985                      990  
 Leu Ser Lys Val Gly Arg Ser Arg Asn Gln Glu Leu Ala Gln Lys Ile  
                     995                      1000                      1005  
 Asp Asn Leu Asn Gln Ala Val Ser Glu Ala Lys Ala Gly Phe Phe  
 1010                      1015                      1020  
 Gly Asn Leu Glu Gln Thr Ile Asp Lys Leu Lys Asp Ser Thr Lys  
 1025                      1030                      1035  
 Lys Asn Val Met Asn Leu Tyr Val Glu Ser Ala Lys Lys Val Pro  
 1040                      1045                      1050  
 Ala Ser Leu Ser Ala Lys Leu Asp Asn Tyr Ala Ile Asn Ser His  
 1055                      1060                      1065  
 Thr Arg Ile Asn Ser Asn Ile Gln Asn Gly Ala Ile Asn Glu Lys  
 1070                      1075                      1080  
 Ala Thr Gly Met Leu Thr Gln Lys Asn Pro Glu Trp Leu Lys Leu  
 1085                      1090                      1095

Val Asn Asp Lys Ile Val Ala His Asn Val Gly Ser Val Ser Leu  
1100 1105 1110

Ser Glu Tyr Asp Lys Ile Gly Phe Asn Gln Lys Asn Met Lys Asp  
1115 1120 1125

Tyr Ser Asp Ser Phe Lys Phe Ser Thr Lys Leu Asn Asn Ala Val  
1130 1135 1140

Lys Asp Ile Lys Ser Gly Phe Thr His Phe Leu Ala Asn Ala Phe  
1145 1150 1155

Ser Thr Gly Tyr Tyr Cys Leu Ala Arg Glu Asn Ala Glu His Gly  
1160 1165 1170

Ile Lys Asn Val Asn Thr Lys Gly Gly Phe Gln Lys Ser  
1175 1180 1185

<210> 9  
<211> 201  
<212> PRT  
<213> Homo sapiens

<400> 9

Ser Ser Gly Pro Ser Ser Ser Leu Asp Asn Gly Asn Ser Leu Asp Val  
1 5 10 15

Leu Lys Asn His Val Leu Asn Glu Leu Ile Gln Thr Glu Arg Val Tyr  
20 25 30

Val Arg Glu Leu Tyr Thr Val Leu Leu Gly Tyr Arg Ala Glu Met Asp  
35 40 45

Asn Pro Glu Met Phe Asp Leu Met Pro Pro Leu Leu Arg Asn Lys Lys  
50 55 60

Asp Ile Leu Phe Gly Asn Met Ala Glu Ile Tyr Glu Phe His Asn Asp  
65 70 75 80

Ile Phe Leu Ser Ser Leu Glu Asn Cys Ala His Ala Pro Glu Arg Val  
85 90 95

Gly Pro Cys Phe Leu Glu Arg Lys Asp Asp Phe Gln Met Tyr Ala Lys  
100 105 110

Tyr Cys Gln Asn Lys Pro Arg Ser Glu Thr Ile Trp Arg Lys Tyr Ser  
115 120 125

Glu Cys Ala Phe Phe Gln Glu Cys Gln Arg Lys Leu Lys His Arg Leu  
130 135 140

Arg Leu Asp Ser Tyr Leu Leu Lys Pro Val Gln Arg Ile Thr Lys Tyr  
145 150 155 160

Gln Leu Leu Leu Lys Glu Leu Leu Lys Tyr Ser Lys Asp Cys Glu Gly  
165 170 175

Ser Ala Leu Leu Lys Lys Ala Leu Asp Ala Met Leu Asp Leu Leu Lys  
180 185 190

Ser Val Asn Asp Ser Met His Gln Ile  
195 200